

REMARKS

5 In response to the Examiner's Action mailed on March 31, 2003, the drawings and the Specification are amended, claims 13 to 15 are cancelled and claims 2, 4 to 7 and 12 are amended. The applicant hereby respectfully requests that the patent application be reconsidered.

10 An item-by-item response to Examiner's objections or rejections is provided in the followings:

1-5. Objection to Drawings

- 15 1. Figures 1, 1 A and 1B should be designated by a legend such as -- Prior Art-- because only that which is old is illustrated. See MPEP § 60802(g). These figures are discussed in the background section of the specification.
2. The drawings are objected to because Figs. 1 and 1A appear to be identical, albeit they have different captions. Fig. 1 is not referred to in the specification at all.
- 20 3. Fig. 4 appears to be identical to Fig. 2, albeit they have different captions.
4. There appears to be a notation on sheet 5 of the drawings (perhaps from the invention this, along with the address that appears there, should be deleted.
- 25 5. Although there appears to be a Fig. 9, this is not listed in the list of figures. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

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In response to the Objections a set of corrected drawings is submitted with all the informalities as stated above corrected.

September 2, 2003

6. *Objections to the Specification*

The Examiner objects to the disclosure because of the following informalities:

- 5 (i) Fig. 1 is not listed in the list of drawings on page 7 of the specification. Either the should be listed, or else it should be deleted.
- (ii) On page 3, line 6, reference is made to Schottky diodes (with upper case S), but on lines 11 and 19 (and in page 4 as well) the diodes are referred to schottky diodes (with lower case s). Consistent use throughout
10 the disclosure is required.
- (iii) In the Brief Description of the Drawings on page 7, Fig. 4 is said to a "functional block diagram of a desired new functions..." But, this appears not to be the case. As noted in paragraph 3 above, Fig. 4 appears to be identical to Fig. 2.
- 15 (iv) The Brief Description of the Drawings on page 7, lists Figs. SA and SB; these figures do not exist.

In response to the objections, the drawings are amended and the Specification is amended with all the informalities as discussed above
20 corrected.

7 *Claim Objections*

The Examiner objects to claims 12 and 13 because of the following
25 informalities:

In claim 12, the recitation in lines 4 and 5 lacks clarity and precision; MPEP § 2173.02. The recitation appears to be specifying a condition in terms of a "current" when it is reduced below a "threshold voltage." If what is of concern is a voltage, then what is the relevance of
30 the "current threshold detector" recited in line 3?

The recitation "said secondary side" in line 7 of claim 13 lacks

September 2, 2003

antecedent basis. While a "secondary winding" has been recited in line 4, this is not the same as a secondary side.

5 In response to the objection, claim 12 is amended and claim 13 is cancelled.

8-9. Rejection of Claims under 35 USC §102

10 The Examiner rejects claims 2 and 13 under 35 U.S.C. 102(e) as being anticipated by *Porter et al.* Regarding claim 2, *Porter et al* discloses an AC/DC converter (Fig. 3-3) comprising: a transformer (left-hand side of the Fig. 3-3) having a primary side for inputting an input signal (left) and a secondary side for outputting an output DC signal (right, Fig. 3-3); and a synchronous rectifier controller (304, Fig. 3-3; and
15 column 22, lines to column 23, line 1) connected only to circuits on said secondary side (Fig. 3-3) for controlling a synchronous rectifier (SR) switch (SRI) on said secondary side for generating said DC output signal (right-hand side of Fig. 3-3).

20 Regarding claim 13, *Porter et al* discloses a synchronous rectifier controller for an AC-to-DC converter (Fig. 3-3) wherein: said synchronous rectifier (304) controller connected to only to circuits on a secondary winding of a transformer (Fig. 3-3) of said AC-to-DC converter and responding to a voltage of secondary winding for controlling a
25 synchronous rectifier (SR) switch (304) of said secondary side for generating a DC output signal.

30 In response to Examiner's rejection, claims 13 to 15 are cancelled and claims 2, 4-7 and 12 are amended. The Applicant reserve the right to file amended claims in a Continuous Prosecution Application later to address these rejection later. As instructed by the Examiner to allow claim 5, the

September 2, 2003

amended claim 2 is now equivalent to claim 5 and the amended claim 2 would be allowable.

10-13 .Rejection of Claims under 35 USC §103

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The Examiner rejects claims 3, 10, 14 and 15 under 35 U.S.C. 103(a) as being unpatentable over *Porter et al.*, in view of *Gold et al*

10 Regarding claims 3 and 14, which depend respectively on claims 2
and 13, as noted above *Porter et al.* discloses all of the limitations in the
latter claims. *Porter et al.* does not expressly disclose that the SR switch is
a MOSFET transistor having a gate connected to said synchronous
rectifier controller. *Gold et al* discloses a controller for a power conversion
15 system (title; and abstract) in which the synchronous rectifier (SR) switch
is a MOSFET transistor (20, Fig. 2; 22 to 27, Fig. 3; column 6, lines 53-54;
and) having a gate connected to said synchronous rectifier controller (Fig.
2, column 6, lines 54-58; and Figs. 3 and 6, column 6, line 59 to column 7,
line 2). At the time of the invention, it would have been obvious for a
person of ordinary skill in the art to have combined the teaching of *Gold et*
20 *al* with the synchronous rectifier circuit of *Porter et al.* and to have used
MOSFET switches, for the purpose of increasing speed-of-response and
reliability.

25 Regarding claims 10 and 15, which depend respectively on claims 3
and 14, as noted above *Porter et al.* and *Gold et al* disclose all of the
limitations in the latter claims. *Gold et al.* also discloses that the SR switch
(20, Fig. 2 and 22-27, Fig. 3) is a N-channel MOSFET transistor (column 7,
lines 34-35) having a gate (22a-27a, Fig. 3) connected to said synchronous
rectifier controller for turning off said MOSFET (column 7, lines 1-2) when
a drain of said N-channel MOSFET transistor is driven high (column 7,
30 lines 5 ft). At the time of the invention, it would have been obvious for a
person of ordinary skill in the art to have combined the teaching of *Gold et*
al with the synchronous rectifier circuit of *Porter et al.* and to have used N-

September 2, 2003

channel MOSFET switches, since these are suitable for low voltage, high-current applications such as computer power supplies.

5 The Examiner rejects claims 4 and 11 under 35 U.S.C. 103(a) as being unpatentable over *Porter et al.*, in view of *Rozman*.

10 Regarding claim 4, *Porter et al.* discloses all the limitations of claim 2 on which claim 4 depends. *Porter et al.* does not disclose that the synchronous rectifier further comprises a plurality of circuit elements for turning off said SR switch before a main switch driving said transformer on and for turning on said SR switch when the main switch of said transformer is turned off. *Rozman* discloses a synchronous rectifier (title; abstract; and column 1, lines 12-16) that comprises a plurality of circuit elements (Figs. 1 and 3) for turning off said SR switch before a main switch (101, Fig. 3) driving said transformer on and for turning on said SR switch (105) when the main switch of said transformer is turned off (column 3, lines 27-29 and 53-54; and column 2, lines 52 ff).. At the time of the invention, it would have been obvious for a person of ordinary skill in the art to have combined the teaching of *Rozman* with the synchronous rectifier circuit of *Porter et al.* for the purpose of improved switching efficiency (*Rozman*; column 1, lines 20-30).

25 Regarding claim 11, *Porter et al.* discloses all the limitations of claim 2 on which claim 11 depends. *Porter et al.* does not disclose that the synchronous rectifier controller comprises an voltage clamp waveform clipper connected to an output of the secondary winding of said transformer for providing a square waveform corresponding to the output of said secondary winding. *Rozman* discloses a synchronous rectifier (title; abstract; and column 1, lines 12-16) that comprises an voltage clamp waveform clipper (Fig. 3; and column 3, lines 17-21) connected to an output of the secondary winding of said transformer for providing a square waveform (Fig. 4) corresponding to the output of said secondary

September 2, 2003

winding (column 3, lines 54ff). At the time of the invention, it would have been obvious for a person of ordinary skill in the art to have combined the teaching of *Rozman* with the synchronous rectifier circuit of *Porter et al.* for the purpose of improved efficiency (*1? ozman*; column 4, lines 1-4).

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The Examiner rejects claims 4 and 11 under 35 U.S.C. 103(a) as being unpatentable over *Porter et al.*, in view of *Boylan et al.*

10 Regarding claim 12, which depends on claims 2, as noted above
Porter et al. discloses all of the limitations in the latter claim. *Porter et al.*
does not expressly disclose that the said synchronous rectifier controller
further comprises a current threshold detector connected to an output of a
secondary winding of said transformer for sensing and turning off said SR
15 switch when the current output of said secondary winding is reduced
below a threshold value. *Boylan et al.* discloses a circuit for controlling a
synchronous rectifier (title; and 330, Fig. 3) in which the synchronous
rectifier controller (Fig. 3) further comprises a current threshold detector
(365) connected to an output of a secondary winding (335) of said
20 transformer for sensing and turning off (column 7, lines 49-50) said SR
switch (SR1) when the current output of said secondary winding is
reduced below a threshold value (375; and column 7, lines 44-46). At the
time of the invention, it would have been obvious for a person of ordinary
skill in the art to have combined the teaching of *Boylan et al.* with the
synchronous rectifier circuit of *Porter et al.* for the purpose of efficient
25 control of the rectifier.

30 In response to Examiner's rejection, claims 13 to 15 are cancelled and
claims 2, 4-7 and 12 are amended. The Applicant reserve the right to file
amended claims in a Continuous Prosecution Application later to address
these rejection later. As instructed by the Examiner to allow claim 5, the
amended claim 2 is now equivalent to claim 5 and the amended claim 2
and claims 3-12 as dependent claims would be allowable.

September 2, 2003

14-16 Allowable Subject Matter

5 The Examiner allows claim 1 and instructed that claims 5-9 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

10 Regarding claim 1, prior art does not disclose a synchronous rectifier control circuit comprising a means for generating a dead time, a pulse differentiator, a voltage-ramping means and a charge integrator, in the combination claimed. Regarding claim 5, prior art does not disclose a synchronous rectifier comprising a deadtime means, in the combination claimed. Regarding claim 6, prior art does not disclose a synchronous rectifier comprising a pulse differentiator, in the combination claimed.
15 Regarding claim 7, prior art does not disclose a synchronous rectifier comprising a voltage-ramping means, in the combination claimed.

20 In response to the allowance, claim 2 is amended by adding all the elements and limitation originally included in claim 5 and claim 2 would be allowable. Claims 3 to claim 12 are now dependent claims of claim 2 and would also be allowable.

September 2, 2003

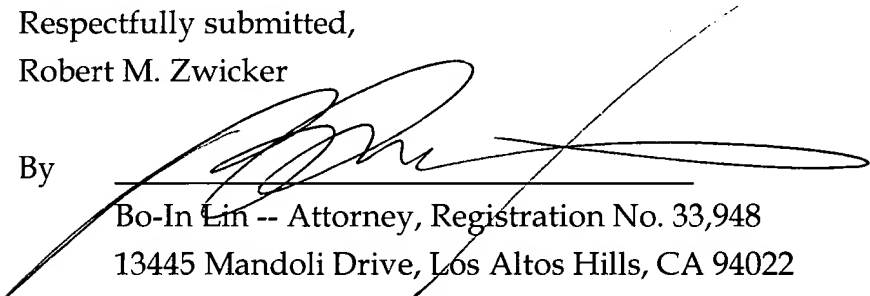
With the amended claims and the reasons provided above, the applicant hereby respectfully requests that Examiner's rejections under 35 USC § 102, and 35 USC § 103 be withdrawn and the present application be allowed.

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Respectfully submitted,
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By

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September 2, 2003